

Science Bowl Questions 1994

Round 13

Toss-Up

1. MATH; Multiple Choice: About how many years does it take for \$100 invested at 5 percent interest, compounded annually, to increase to \$150?
 - a) 5 years
 - b) 8 years
 - c) 13 years
 - d) 25 years

ANSWER: B – 8 YEARS

Bonus

1. MATH; Short Answer: About how many years does it take for the \$100 invested to double?

ANSWER: 14 YEARS

Toss-Up

2. PHYS; Multiple Choice: At the surface of a charged conductor, the electric field lines are:
 - a) parallel
 - b) perpendicular to the surface
 - c) nonexistent
 - d) at an angle of 45 degrees to the surface

ANSWER: B – PERPENDICULAR TO THE SURFACE

Bonus

2. PHYS; Multiple Choice: Two tug-of-war teams are pulling on the ends of a rope, each team with a force of 1000 Newtons (N). If the rope does not move, the tension in the rope is:
 - a) 0 N
 - b) 500 N
 - c) 1000 N
 - d) 2000 N

ANSWER: C – 1000 N

Toss-Up

3. BIOL; Multiple Choice: Which of the following plant micronutrients is essential for nitrogen fixation?
- a) Copper
 - b) Manganese
 - c) Magnesium
 - d) Molybdenum

ANSWER: D - MOLYBDENUM

Bonus

3. BIOL; Multiple Choice: What type of soil will develop beneath a forest dominated by spruce and fir?
- a) Histosol
 - b) Spodosol
 - c) Oxisol
 - d) Mollisol

ANSWER: B - SPODOSOL

Toss-Up

4. CHEM; Multiple Choice: The common alloy, babbit metal, is used in bearings. Name any two of the three elements found in it:

ANSWER: TIN, ANTIMONY AND COPPER

Bonus

4. CHEM; Short Answer: What is the name given to an element that exists in two or more physical forms?

ANSWER: ALLOTROPIC

Toss-Up

5. COMP; Multiple Choice: The offsetting of the tremendous variation in I/O speeds for various devices by the use of a device of intermediate speed is known as:
- a) unbundling
 - b) channeling
 - c) spooling
 - d) loading

ANSWER: C – SPOOLING

Bonus

5. COMP; Multiple Choice: The name given to a special-purpose computer devoted to handling I/O independently of the main processor of the computer system is:
- a) loader
 - b) channel
 - c) track
 - d) bundler

ANSWER: B – CHANNEL

Toss-Up

6. BIOL; Multiple Choice: Earthworms will be abundant in soil which has developed beneath which of the following woody species?
- a) Eastern Red Cedar
 - b) Great Rhododendron
 - c) White Pine
 - d) White Spruce

ANSWER: A – EASTERN RED CEDAR

Bonus

6. BIOL; Multiple Choice: Mustard oil provides the hot taste in which of the following vegetables?
- a) Garlics
 - b) Jalapeno peppers
 - c) Onions
 - d) Radishes

ANSWER: D - RADISHES

Toss-Up

7. PHYS; Multiple Choice: A static charge can experience a force due to:
- a) electric fields only
 - b) magnetic fields only
 - c) electric or magnetic fields
 - d) none of the above

ANSWER: A – ELECTRIC FIELDS ONLY

Bonus

7. PHYS; Multiple Choice: As a skydiver falls through the air, her terminal speed depends on:
- a) her mass
 - b) her body's orientation
 - c) the density of the air
 - d) all of the above

ANSWER: D – ALL OF THE ABOVE

Toss-Up

8. CHEM; Short Answer: The block of elements in the periodic table which are filling the 4-f electron shell are known as:

ANSWER: LANTHANIDES

Bonus

8. CHEM; Short Answer: Identify any FIVE elements named after astronomical bodies

ANSWER: PALLADIUM; URANIUM; PLUTONIUM; NEPTUNIUM; SELENIUM;
TELLURIUM; HELIUM; CERIUM, MERCURY

Toss-Up

9. ASTR; Short Answer: What was the name of Armstrong and Aldrin's lunar module?

ANSWER: THE EAGLE

Bonus

9. ASTR; Short Answer: How many astronauts manned each Apollo flight?

ANSWER: THREE

Toss-Up

10. PHYS; Multiple Choice: The energy supplied to establish a current in an inductor is:

- a) negative
- b) positive
- c) stored in the inductor's magnetic field
- d) none of the above

ANSWER: C – STORED IN THE INDUCTOR'S MAGNETIC FIELD

Bonus

10. PHYS; Multiple Choice: Which of the following is an example of a pseudo or fictitious force?

- a) gravitational
- b) Coriolis
- c) weak nuclear
- d) centripetal

ANSWER: B - CORIOLIS

Toss-Up

11. CHEM; Multiple Choice: Which of the following statements is true?

- a) All pure substances are elements
- b) All compounds are pure substances
- c) All compounds are mechanical mixtures
- d) All pure substances are indivisible

ANSWER: B – ALL COMPOUNDS ARE PURE SUBSTANCES

Bonus

11. CHEM; Short Answer: Mendeleev proposed the existence of an unknown element that he called eka-aluminum. What is the element called now?

ANSWER: GALLIUM

Toss-Up

12. BIOL; Multiple Choice: Of the enzymes used during DNA replication, which one is responsible for breaking the hydrogen bonds between the bases?

- a) helicase
- b) gyrase
- c) single strand binding protein
- d) ligase

ANSWER: A - HELICASE

Bonus

12. BIOL; Multiple Choice: How does water move from the roots to the leaves of a tree?

- a) forced through the vascular tissue by the interaction between gravity and atmospheric pressure
- b) pulled through the vascular tissue by negative pressure generated by the sun's energy
- c) pumped through the vascular tissue by an organ located in the roots
- d) pushed through the vascular tissue by positive pressure generated by the plant itself

ANSWER: B – PULLED THROUGH THE VASCULAR TISSUE BY NEGATIVE PRESSURE GENERATED BY THE SUN'S ENERGY

Toss-Up

13. ERSC; Multiple Choice: Mauna Loa is the site for the continuing measurement of variables related to global warming. Which variable is being measured at Mauna Loa?
- a) warming sea surface temperature
 - b) increases in the solar constant
 - c) increases in atmospheric carbon dioxide
 - d) effects of cloud cover on solar radiation at the surface

ANSWER: C – INCREASES IN ATMOSPHERIC CARBON DIOXIDE

Bonus

13. ERSC; Short Answer: What is the source of the longest historical record of the atmospheric concentrations of carbon dioxide?

ANSWER: BUBBLES OF AIR TRAPPED IN GLACIER ICE

Toss-Up

14. CHEM; Multiple Choice: The metallic element with the highest melting point is:
- a) Tantalum
 - b) Tungsten
 - c) Rhodium
 - d) Molybdenum

ANSWER: B - TUNGSTEN

Bonus

14. CHEM; Multiple Choice: Which of the following molecules has a permanent electric dipole moment?
- a) water
 - b) chlorine
 - c) methane
 - d) nitrogen

ANSWER: A - WATER

Toss-Up

15. PHYS; Multiple Choice: If a sample of radioactive material is gamma counted, resulting in a count rate of N counts per minute, and a week later the sample is recounted, resulting in a count rate of $N + 1000$ counts per minute< which of the following is occurring?
- a) The sample is getting older and the decay rate increases
 - b) The daughter product of the original sample decays slower than the original sample.
 - c) The daughter product of the original sample decays faster than the original sample.
 - d) The decay rate is slowing down.

ANSWER: C – THE DAUGHTER PRODUCT OF THE ORIGINAL SAMPLE DECAYS FASTER THAN THE ORIGINAL SAMPLE

Bonus

15. PHYS; Multiple Choice: Negative work means:
- a) the kinetic energy of the object increases
 - b) the applied force is variable
 - c) the applied force is perpendicular to the displacement
 - d) the applied force is opposite to the displacement

ANSWER: D – THE APPLIED FORCE IS OPPOSITE TO THE DISPLACEMENT

Toss-Up

16. BIOL; Multiple Choice: The typical karyotype for Turner's syndrome, a human cytogenetic sex disorder is:
- a) XXY
 - b) XYY
 - c) X
 - d) XXX

ANSWER: C – X

Bonus

16. BIOL; Multiple Choice: Molecules with biological characteristics important for maintaining human health are often categorized by the elements contained in the molecule, as well as, how the elements are connected together. Which molecule named below is not similar in chemical structure to the others?
- a) Ascorbic Acid
 - b) Cholesterol
 - c) Estrogen
 - d) Vitamin D

ANSWER: A – ASCORBIC ACID (others are steroid based or steroid similar)

Toss-Up

17. CHEM; Multiple Choice; Which of the following elements has the highest electronegativity?

- a) Lithium
- b) Iodine
- c) Cesium
- d) Oxygen

ANSWER: D – OXYGEN

Bonus

17. CHEM; Multiple Choice: Which of the following molecules has a permanent dipole moment?

- a) boron trifluoride
- b) ammonia
- c) carbon tetrachloride
- d) methane

ANSWER: B – AMMONIA

Toss-Up

18. MATH; Multiple Choice: If a Computer Dating Service has cards for 230 men and 480 women, how many different men-women pairs can it arrange?

- a) 710
- b) 51,000
- c) 110,000
- d) more than 1,000,000

ANSWER: C – 110,000

Bonus

18. MATH; Short Answer: If the Dating Service gets 1 additional card for a man and 1 additional card for a woman, how many ADDITIONAL dates can it arrange?

ANSWER: 711

Toss-Up

19. ASTR; Short Answer: What travels through space at 66,700 miles per hour?

ANSWER: THE EARTH

Bonus

19. ASTR; Short Answer: Who was the first American to walk in space?

ANSWER: EDWARD H. WHITE, II

Toss-Up

20. BIOL; Multiple Choice: The proportion of babies in the U.S. born with Down's Syndrome is approximately:

- a) 1 in 70
- b) 1 in 700
- c) 1 in 7,000
- d) 1 in 70,000

ANSWER: B – 1 IN 700

Bonus

20. BIOL; Multiple Choice: The principal factor thought to cause the symptoms associated with Down's Syndrome is:

- a) excessive purine biosynthesis
- b) sugar imbalance
- c) excessive ATP production
- d) underproduction of antibodies

ANSWER: A – EXCESSIVE PURINE BIOSYSTHESIS

Toss-Up

21. GENR; Short Answer: What butterfly has the same name as a punctuation mark?

ANSWER: THE COMMA

Bonus

21. GENR; Short Answer: Which anthropologist wrote Coming of Age in Samoa?

ANSWER: MARGARET MEAD

Toss-Up

22. ERSC; Multiple Choice: The stratosphere is the upper layer of the atmosphere where ozone is abundant. This abundance of ozone occurs there primarily because of high levels of:

- a) ultraviolet radiation
- b) lightning
- c) jet contrails
- d) carbon dioxide

ANSWER: A – ULTRAVIOLET RADIATION

Bonus

22. ERSC; Multiple Choice: On average, the latitudinal region on earth that has the highest infrared radiation to space is the:

- a) tropics
- b) sub-tropics
- c) mid-latitudes
- d) polar regions

ANSWER: B – SUB-TROPICS

Toss-Up

23. PHYS; Multiple Choice: The property by which a varying current induces an electromotive force in its own circuit or a neighboring circuit is called:

- a) inductance
- b) permanent magnetism
- c) conductivity
- d) resistance

ANSWER: A - INDUCTANCE

Bonus

23. PHYS; Multiple Choice: The reference point for gravitational potential energy:

- a) must be at the initial position of the object
- b) must be at the final position of the object
- c) must be at ground level
- d) can be chosen arbitrarily

ANSWER: D – CAN BE CHOSEN ARBITRARILY

Toss-Up

24. COMP; Multiple Choice: Which fo the following techniques is a hardware technique used in high performance computer systems to exploit certain types of parallelism in instruction processing?

- a) pipelining
- b) networking
- c) multiprocessing
- d) multitasking

ANSWER: A - PIPELINING

Bonus

24. COMP; Short Answer: The following equation is found in a program written in BASIC:

$y = 6 - A * B / C$ (read: y equals 6 minus A star B slash C)

What is the SECOND mathematical operation that will be carried out by the computer?

ANSWER: DIVISION or DIVISION BY C

Toss-Up

25. GENR; Multiple Choice: Roughage is important in the human diet because it:

- a) contains vitamins
- b) speeds up digestion
- c) stimulates the walls of the large intestine
- d) slows digestion

ANSWER: C – STIMULATES THE WALLS OF THE LARGE INTESTINES

Bonus

25. GENR; Multiple Choice: Greenhouse gases cause global warming because they:

- a) Hinder passage of short wave radiation
- b) Hinder passage of long wave radiation
- c) Cause sever droughts
- d) Create tornadoes

ANSWER: B – HINDER PASSAGE OF LONG WAVE RADIATION
